This is what you get to use on test:

Mechanics Formulas:

TNEOM: $V_f = V_i + a\Delta t$

$\Delta x = V_i\Delta t + \frac{1}{2}a\Delta t^2$

$V_f^2 = V_i^2 + 2a\Delta x$

Weight: $F_{gravity} = mg$

Gravitation: $Fg = \frac{G\, m_1\, m_2}{r^2}$

Gravitation constant: $G = 6.67 \times 10^{-11}\ Nm^2/kg^2$

(just G's units)↑

Force: $F = ma$

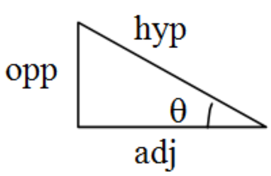
Friction: $f = \mu N$

Trig formulas:

$\tan\theta = opp / adj$

$\sin\theta = opp / hyp$

$\cos\theta = adj / hyp$



Pythagorean Theorem: $a^2 + b^2 = c^2$

Kinetic energy: $KE = \frac{1}{2}\, m\, v^2$

Potential energy: $PE = mgh$

Work energy: $W = Fd\cos\theta$

spring energy: $E_{sp} = \frac{1}{2}\, kx^2$

efficiency = $W_{out} / W_{in} \times 100\%$

power: $P = \frac{W}{\Delta t} = F\, v$

momentum: $p = mv$

impulse: $I = F\Delta t = m\Delta v$

circular motion:

centripetal velocity: $v = \frac{2\pi r}{t}$

centripetal acceleration: $a_c = \frac{v^2}{r}$

E&M Formulas:

Coulomb's Law: $F = \left|\frac{k\, Q_{source}\, q_{test}}{r^2}\right|$

Coulomb's constant: $k = 9.00 \times 10^9\ Nm^2/C^2$

(just k's units) ↑

Electron charge: $e = -1.60 \times 10^{-19}$ C

Electron mass: 9.11×10^{-31} kg

Proton mass: 1.67×10^{-27} kg

Electric Field: $E = \frac{F}{q_{test}}$

(E for point source) $E = \left|\frac{k\, Q_{source}}{r^2}\right|$

Potential: $V = \frac{PE}{q_{test}}$

(V for point source) $V = \frac{k\, Q_{source}}{r}$

(V for parallel plates) $V = E\, d$

Potential Energy (for Point sources): $PE = \frac{k\, Q_{source}\, q_{test}}{r}$

Ohm's Law: $V = I\, R$

Power: $P = I\, V$

Series: $R_{tot} = R_1 + R_2 + \ldots$

Parallel: $1/R_{tot} = 1/R_1 + 1/R_2 + \ldots$

Magnetic force:

(for moving charge) $F = qv \times B$

(for current in wire) $F = IL \times B$

Induced voltage/emf $\varepsilon = -\frac{N\,(\Delta AB)}{\Delta t}$

Unit 08 – Vocabulary and Equations – Electrostatics

Vocabulary:
previous vocabulary
charge, positive, negative
static electricity, current electricity
attraction, repulsion
proton, neutron, electron
conservation of charge
fundamental charge, elementary charge, quantized
T, G, M, k, c, m, μ, n (notes 01-01: prefixes and values memorized!)
conductor, insulator
charging by conduction, charging by induction, ground
polarization, fiction charging
Coulomb's law, Coulomb's constant, coulomb (C)
electrostatic force, electromagnetic force, electrical force
field force, contact force
electric field, electric field strength, test charge
vector, scalar, resultant
Triboelectric series
electrical potential energy, Joule (J)
voltage, Volt (V)
electroscope, Tesla coil,
Faraday cage, Van de Graaff generator
capacitor, Leyden jar

Symbols: F, k, q, d, r, E, e, J, C, PE, V

Equation	Units	Notes
$F = k\frac{q_1q_2}{r^2}$	N	Coulomb's law. Forces needs two charges. Neg. means attraction. Vector.
$E = \frac{F}{q} = \frac{kq}{r^2}$	N/C or V/m	Electric field strength. Single charge creates an E field. You assume a tiny positive test charge present. Vector.
$\Delta PE = -qEd$	J	E must be constant ("uniform electric field"). Displacement is parallel to E field. Good for capacitors. Scalar.
$\Delta V = \Delta PE/q = kq/r$	V	Potential difference is volts and defined as PE per charge. Scalar.
$\Delta PE = k\frac{q_1q_2}{r}$	J	PE for two charges separated by distance r, compared to infinity. Scalar.
$\Delta V = -Ed$	V	E must be constant ("uniform electric field"). Displacement is parallel to E field. Good for capacitors. Scalar.
$Q = ne$	C	Charge is "quantized". Amt. of charge NOT a real #. Scalar.

$e = 1.60 \times 10^{-19}$ C $k = 9.0 \times 10^9\ Nm^2/C^2$

Unit Objectives - Williams
1. Particles and interactions (includes methods of charging)
2. Coulomb's law and vector addition of electrostatic forces
3. Electric fields and vector addition of electric fields
4. Potential Energy and electric potentials

DuPage ROE Objectives
501. I can identify the charge on each sub-atomic particle.
502. I can identify which sub atomic particle moves in a conductor.
503. I can compare and contrast conductors and insulators.
504. I can predict how charges will redistribute based on charging by contact and induction.
505. I can predict attraction and repulsion between charged and neutral objects and the processes that cause them.
506. I can apply Coulomb's Law.
507. I can describe an electric field and identify the electric field diagrams for a one or two charge system.
508. I can identify the direction of the force on a charged object in an electric field.